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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/426,644	10/25/1999	JAE-HO MOON	1349.1022/MD	2168

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EXAMINER

TUGBANG, ANTHONY D

ART UNIT	PAPER NUMBER
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3729

DATE MAILED: 06/30/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/426,644

Applicant(s)

MOON ET AL.

Examiner

A. Dexter Tugbang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 April 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,13-17,19,21,23,24,27,30,38,40 and 42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13-16,21,24,27,30 and 42 is/are allowed.
- 6) ☒ Claim(s) 1,2,17,38 and 40 is/are rejected.
- 7) ☒ Claim(s) 19 and 23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The applicants' amendment filed 4/4/03 (Paper No. 25) has been fully considered and made of record.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 103

3. Claims 1, 2 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Campanelli 4,878,992 and Hawkins et al Re. 32,572 (referred to hereinafter as Hawkins' 572) in view of Hawkins et al 5,006,202 (referred to hereinafter as Hawkins' 202).

Regarding Claim 1, Campanelli discloses the claimed manufacturing method comprising: forming a nozzle part (channel plate 31); adhering a membrane (polymer layer 58) to the formed nozzle part 31 and a heat driving part (heating element wafer 36) to form the fluid jetting apparatuses as a wafer (shown in Fig. 1), which will eventually be separated into individual fluid jetting apparatuses. The wafer (shown in Fig. 1) of Campanelli comprising the membrane 58, nozzle part 31 and heat driving part 36 are considered to be a shape of an undivided wafer to the extent that they are integrally attached to one another prior to being split by the dicing blade 20. The heat driving part 36 includes fluid chambers (through hole 35). The membrane 58 surrounds or separates the fluid chambers 35 of the heat driving part from the nozzle part 31 and is between the nozzle part 31 and the heat driving part 36 (shown in Figures 5 and 6).

NOTE: Hawkins' 572 is incorporated by reference within the disclosure of Campanelli (see Campanelli at col. 4, lines 65-67).

Regarding Claim 2, Hawkins' 572 teaches forming electrodes 33 and heating elements 34 on a first substrate of a silicon wafer 36 (shown in Fig. 5); and forming driving fluid barriers (upper substrate 31) on top of the electrodes 33 and the heating elements 34.

Regarding Claim 38, Campanelli further teaches splitting of the nozzle part, heat driving part and membrane, assembled together in the form of the wafer (shown in Fig. 2) by a dicing blade 20 (shown in Fig. 3) to form separate fluid jetting apparatuses.

Neither Campanelli nor Hawkins' 572 teaches forming the nozzle part by a spinning process.

Hawkins' 202 teaches forming a nozzle part (channel plate 12 in Fig. 16) by a spinning process of spin coating layers of photoresists to etch and shape the nozzle part (see col. 6, lines 12-42). The benefits of such a spinning process leaves a precision, etched nozzle part ready to be separated into multiple fluid jetting apparatuses (see col. 3, lines 65-68).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the nozzle part of either Campanelli or Hawkins' 572 by the spinning process of Hawkins' 202, to positively provide a precision, etched nozzle part ready to be separated into multiple fluid jetting apparatuses.

4. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Leban 5,229,785 in view of Baise et al 4,371,565.

Regarding Claim 17, Leban discloses the claimed manufacturing method for a plurality of fluid jetting apparatuses comprising: forming a nozzle part on a wafer (dummy substrate 10)

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by a spinning process (see col. 4, lines 56-60); adhering the nozzle part with the wafer to a membrane (barrier layer 22); removing the wafer 10 from the nozzle part (see Fig. 1H); and adhering the membrane 22 with the adhered nozzle part (shown in Fig. 1G) to a heat driving part (heater element 36 and substrate 34) such that the membrane 22 is between the heat driving part 34, 36 and jetting fluid chambers (orifices 20) to form the fluid jetting apparatuses (see col. 7, lines 43-48). The nozzle part, membrane and heat driving part are formed as an undivided unit (as shown in either one of Figures 1H, 2B or 4).

Leban does not teach that the wafer is made of the material of silicon.

Baise teaches that it is known in the art of spinning processes, i.e. spin coatings, to form polymeric layers on a substrate wafer made of silicon material (see col. 1, lines 49-53). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the nozzle part material of Leban on a substrate wafer made of silicon material, as taught by Baise, for the purpose of performing an equivalent spinning process of spin coating.

5. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Leban in view of Baise, as applied to claim 17 above, and further in view of Campanelli.

Leban, as modified by Pan, teaches the claimed manufacturing method as previously discussed including the suggestion of forming a plurality of fluid jetting apparatuses (at col. 7, lines 43-48 of Leban). The modified Leban method does not teach splitting the adhered nozzle part, membrane, and heat driving part into separate fluid jetting apparatuses.

Campanelli, as relied upon above, teaches batch fabrication of a plurality fluid jetting apparatuses in which each fluid jetting apparatus is formed into a continuous wafer or continuous piece. Subsequently, Campanelli splits the continuous wafer or continuous piece into a plurality

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of fluid jetting apparatuses by utilizing a dicing blade to ultimately provide an inexpensive manufacturing process for creating high quality fluid jetting apparatuses (see col. 9, lines 8-12).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have improved the modified Leban method by batch fabrication of the fluid jetting apparatuses, as taught by Campanelli, to positively provide an inexpensive manufacturing process for creating high quality fluid jetting apparatuses.

Response to Arguments

6. Applicant's arguments filed 4/4/03 (Paper No. 25) have been fully considered but they have not been deemed to be found as persuasive.

I. In regards to the merits of Campanelli and Hawkins as applied to the rejection of Claim 1 above, applicants appear to allege that neither teach adhering a membrane to the formed nozzle part and a heat driving part including fluid chambers for the corresponding fluid jetting apparatuses so as to position the heat driving part, the membrane and the nozzle part such that the membrane is disposed therebetween to separate the fluid chambers from the nozzle part.

The examiner most respectfully disagrees. From Campanelli's Figure 2, clearly the membrane 58 is located in-between the nozzle part 31 and the heat driving part 36. The fluid chambers 35 are separated from the nozzle part 31 in that the upper surface of the membrane 58 forms the lower boundary of the fluid chambers 35 (as shown in Fig. 5). The emphasis on this lower boundary is what separates the fluid chambers 35 from the nozzle part 31.

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II. In regards to the merits of Leban as applied to the rejection of Claims 17 and 40, the applicants' contend that Leban does not teach that the membrane is between the heat driving part and jetting fluid chambers of the nozzle part.

The examiner traverses to the extent that the "jetting fluid chambers" can now be read as orifices 20 of the nozzle part 14 and thus, the limitations are fully satisfied by Leban in that the membrane 22 is located between the heat driving part 34, 36 and the fluid chambers 20 of the nozzle part 14 (as shown in Fig. 1H).

In response to the applicant's argument that Campanelli does not disclose any membrane and thus, cannot be combined with Leban and Baise (as applied in the rejection of Claim 40), the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). Moreover, the feature of the "membrane" was relied upon in the teaching of Leban.

Allowable Subject Matter

7. Claims 13-16, 21, 24, 27, 30 and 42 are allowed.

8. Claims 19 and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dexter Tugbang whose telephone number is 703-308-7599. The examiner can normally be reached on Monday - Friday 9:00 am - 5:30 pm.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0858.



**A. Dexter Tugbang
Primary Examiner
Art Unit 3729**

June 25, 2003